eprints@whiterose.ac.uk
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The Mereology of Representation

Jessica Leech.

Abstract

Mental representations – like many other things – seem to have parts. However, it isn't clear how to properly understand the idea of a part of a representation. In this paper I shed new light on how representations can have a mereology. In particular, it has been recognized that there is a mereological element to Kant's distinction between two kinds of representations: intuitions and concepts. A concept depends upon its parts, whereas an intuition is prior to its parts. The paper thus focuses on an exploration of how to make sense of the parts and wholes of intuitions and concepts.

I. Part and Wholes. It is natural to think of the world around us as containing whole things made up of, or decomposable into, their parts. Walls are made of bricks (and mortar). A human has body parts (head, shoulders, knees, toes etc.). We analyse sentences into their words. And so on.

At least on the face of it, there are lots of different kinds of things, and so lots of different ways in which things can have parts. For example, the way in which a brick is part of a wall seems to be different to the way in which Hamlet's 'To be or not to be' soliloquy is part of the play *Hamlet*. There are a host of questions one might then ask about different kinds of wholes and parts, and the different relationships between them. We might also question where to draw a line between genuine cases of a whole with parts, and cases where this is just a manner of speaking. For example, we might say that algebra is part of mathematics, but not take this too literally. The study of such questions is called 'mereology'.

One important kind of mereological question concerns *priority*. Parts can be prior to their wholes (wholes depend upon their parts), or wholes can be prior to parts (parts depend upon the whole). Moreover, there are different senses of dependence. To give two examples: There might be existential dependence. For example, arguably, a wall couldn't exist without some bricks, but the bricks could exist without being built into a wall. Or the dependence might concern the *nature* of the whole or part, such that the properties of one determine the properties of the other. For example, the wall's being solid and rough seems to depend upon its being made of bricks that are solid and rough (compare: a wall made of marshmallows).

Claims are often made about the part-whole (mereological) structure of mental representations.[1] But prior to this kind of claim – if this kind of claim is to be helpful or illuminating – we must first ask ourselves: In what senses can mental representations have parts? The aim of this paper, broadly speaking, is to shed new light on how representations can have a mereology and to offer a new way to make sense of these mereological claims. I seek an answer that doesn't rely on metaphor. For example, we might say that the concept *unmarried* is a part of the concept *bachelor,* but in what sense of part? To say, for example, that the former is 'contained in' the latter is not immediately helpful: concepts are not straightforwardly

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[1] By 'mental representation', I mean to include a range of mental states, events and activities such as thoughts, perceptions and concepts.

like Russian dolls. What we need is a substantive way to understand _what certain representations are_ and then, in terms appropriate to this, _how they have parts_. It might turn out that such part-whole claims cannot, after all, be taken seriously, and that we should take claims about the parts of representations as just a misleading manner of speaking. I hope to show that there is a way to take at least some such claims literally.

This is a broad question, so I shall narrow it by considering it from a particular perspective, that of Kant's distinction between two kinds of representation: intuitions and concepts. There are myriad issues concerning our understanding of this distinction, which I will not have space to consider here, or will only be able to examine briefly. My aim is to focus on the mereological aspect of this distinction: an intuition as a whole is prior to its parts, whilst a concept as a whole is posterior to its parts. The mereological nature of this distinction has been widely recognized (as, for example, by Aquila (1994), Bell (2001), Golob (2011), McLear (2015) and Wilson (1975)), but a question remains unanswered: how exactly should we understand the basis for this mereological distinction? Hence, my question is: in what sense can we understand a mental representation as having parts, so that these Kantian claims make sense, and are plausible? It will be a further question how my conclusions cohere with and support other interpretative and philosophical issues concerning concepts and intuitions.

The advertised aim of this paper is to provide a more secure foundation for mereological claims about representations. However, I also have an ulterior motive. If something like Kant's distinction between intuitions and concepts is true of our representations, then this could have significant ramifications. For example, elsewhere I argue that the purpose of modal judgments may be understood as arising from our having both intuitions and concepts as distinct kinds of representation (see Leech, 2014). This paper thus stands at the beginning of two wider research projects, one to provide a metaphysical basis for the mereology of representation, the other to explore the further philosophical consequences of mereological distinctions amongst our representations.

I proceed as follows. First, I outline the Kantian background and the target distinction. Second, I outline where my paper touches on, and diverges from, debates concerning non-conceptual content. Third, I consider several ways in which we might take representations to have parts, and explain why they are not appropriate for understanding the mereological structure of intuitions. Finally, I introduce and motivate my preferred way to think of the nature of intuitions, which allows us to honour their mereological structure. My proposal depends upon thinking of intuitions as relations.

II. Intuitions and Concepts. Kant famously distinguished between two kinds of representation: intuitions and concepts. Intuitions are singular and immediate, concepts general and mediate:

> [An intuition] is immediately related to the object and is singular; [a concept] is mediate, by means of a mark, which can be common to several things. (A320/B377)

The role of intuitions is to present objects to the mind.

In whatever way and through whatever means a cognition may relate to objects, that through which it relates immediately to them, and at which all thought as a means is directed as an end, is intuition. (A19/B33)

The role of concepts is to enable conceptual thoughts about objects: for example, to describe, characterize and compare objects. Together, these two kinds of representations combine into what Kant calls a cognition. For Kant, both kinds of representation are required for cognition.

Thoughts without content are empty, intuitions without concepts are blind. (A51/B75)

We need intuitions to form a link between our thoughts and the world, but we also need concepts to be able to represent things *as* things, and not merely present them.

Is such a distinction defensible? The natural option would be to develop the definition of intuitions as singular and immediate representations. There is a sizable literature on such accounts, and their problems.[2] Rather than rehearse these discussions, I am interested in considering a third option. Whilst Kant appears to define intuitions and concepts in terms of singularity/generality and immediacy/mediacy, when he argues that certain of our representations (those of space and time) are intuitions rather than concepts, he appeals to <u>mereological</u> features. That is, one can construe at least one key argument as running along the following broad lines.

(1) Representation R has mereological feature M.
(2) Concepts do not have feature M / Intuitions have feature M.
(3) Therefore, R is an intuition and not a concept.

Kant writes:

Space is not a discursive or, as is said, general concept of relations of things in general, but a pure intuition. For, first, one can only represent a single space, and if one speaks of many spaces, one understands by that only parts of one and the same unique space. And these parts cannot as it were precede the single all-encompassing space as its components (from which its composition would be possible), but rather are only thought in it. It is essentially single; the manifold in it, thus also the general concept of spaces in general, rests merely on limitations. From this it follows that in respect to it an <u>a priori</u> intuition (which is not empirical) grounds all concepts of them. (A24-26/B39)

Here is my reconstruction of the argument. Kant describes some features of how we represent space. We can represent to ourselves only one space. So-called 'diverse spaces' are parts of one and the same unique space. Hence, our representation is singular. Moreover, as we represent space, the parts of space are not prior to the whole. Space is essentially just one, single thing: it is not a complex made up of parts. So the notion of a part of space is that of a limitation of the whole, not a component out of which the whole is composed. It is from these mereological claims—that we represent space as having parts only as limitations, and not as prior

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[2] A representative sample includes Hintikka (1969), Land (2013) Parsons (1992), Smit (2000), and Wilson (1975).

components that compose to make the whole space—that Kant moves to his conclusion, that space (by which I read, our *representation of* space) is an intuition.[3] (By this point, Kant has already argued that our representation of space is pure—not derived from sense experience—and not empirical, hence his conclusion that our representation of space is an *a priori* or pure intuition.) Kant does allow, in this argument, that we can have a concept of space, or at least of spaces: '…the general concept of spaces in general, rests merely on limitations'. But this is only because it is grounded in a more fundamental representation of space, an intuition.

The passage, and others like it, suggest the following two mereological principles:

(i)   The whole of an intuition is prior to its parts: the parts depend upon the whole.

(ii)   The parts of a concept are prior to the whole: the whole depends upon the parts.

Several interesting questions can be raised, not least how these mereological features of intuitions relate to their other advertised features of singularity and immediacy. I will have more to say about this below, but first we need to understand the underlying claim that representations have parts. Representations are not like walls and human bodies, where it is relatively easy to look at them and read off their more obvious mereological features. We must do some more work.

III. Mereology and Non-conceptual Content. Before moving on, I want to pause briefly to clarify which questions I am *not* going to address. My topic here is closely related to contemporary debates about non-conceptual content, namely, what is it like, and whether there is any. However, my interest lies slightly to one side of this.

A significant aspect of the conceptualism/non-conceptualism debate focuses on representations of what we might call 'propositional size'—thoughts and perceptions. For example: Can there be non-conceptual content in our thoughts? In our perceptions? Do we need any concepts at all for perception? One argumentative strategy exploits mereological differences between conceptual and non-conceptual content. For example, Fodor (2006) distinguishes between iconic and discursive representations in mereological terms. Discursive (roughly, conceptual) representations have logical form, and so have a canonical decomposition into their constituents, whereas iconic representations have no canonical decomposition—you can slice them as you like into arbitrary parts.

Appeal is often made to the Generality Constraint. Evans writes,

> [I]f a subject can be credited with the thought that a is F, then he must have the conceptual resources for entertaining the thought that a is G, for every property of being G of which he has a conception. This is the condition that I call 'The Generality Constraint'. (Evans, 1982, 104)

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[3] Kant does move on to the conclusion that space itself is nothing more than a form of intuition, but for present purposes it is clearer to keep the distinction between space and our representation of space intact.

The key thought is that conceptual representations—representations that have conceptual content—can be broken down into parts that are re-combinable in a particular way.

In these cases the question of structure is posed for something 'bigger than' a concept or an intuition. A _thought_ is decomposable and re-combinable in certain ways. A discursive representation has _logical form_, and so must be something of propositional shape, not one of the elements put together in that form. (By 'propositional shape' I mean to cover sentences, statements, propositions, thoughts etc.—anything that is or could be expressed using a grammatical declarative sentence.) It is clear that a distinction between representations of this 'size' that do and do not include conceptual content is related to the question of which 'smaller' representations are concepts and which, if any, are intuitions. But I wish to focus on the latter question. As such, I leave aside discussion of conceptualism versus non-conceptualism.[4]

Relatedly, a debate amongst readers of Kant is whether intuitions are able to play their role of presenting objects to the mind without the aid of concepts.[5] Is the activity of the understanding—the faculty of concepts and judgments—already at work in sensibility, our faculty for having intuitions? This is more closely related to my concerns here. In looking for a mereological distinction between intuitions and concepts, I am assuming that there is a genuine difference, and that intuitions are not partly constituted by some conceptual content. However, there may still be room for compatibility with both sides of the debate. One might agree with the conceptualist that without the activity of the understanding intuitions don't give us very much, for example, they might present us with minimal content, but nothing as rich as perception of particulars. Nevertheless, there is still a minimal purely intuitive representation, and therefore still a distinction to be explored.

IV. Different Parts. Returning to the core question: How can we make sense of a mental representation having parts?

Can we think in terms of material or physical parts? No. It may be that representations have a physical realization, for example, a particular pattern of brain activity. But this isn't the sense in which I'm interested in the parts of a representation. I'm interested in the level at which it makes sense to say, for example, that the concept _unmarried_ is a part of the concept _bachelor_. It seems at least possible that the same mental representation could be physically realized in different ways, in different kinds of mind, or upon different occasions. However, this possibility does not seem to affect the structure at issue—that of the concept, say, regardless of how it is realized. Hence, it may be that there is a physical realization of these representations—with accompanying physical parts—but that is beside the point.

We could simply say: representations are abstract entities, so they have abstract parts. But this, on its own, is not illuminating. In what sense do abstract entities have parts? We might imagine them on a model with physical parts. For

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[4] There is of course another issue concerning how intuitions and concepts combine into thoughts, judgments and cognitions. I touch on this in Leech (2012), and Leech and Thomas (2013).
[5] Recent contributions to this debate include Allais (2015), Golob (forthcoming), Land (2015a, 2015b) and McLear (forthcoming).

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example, I can imagine the proposition *that grass is green* written out like a sentence, and see that the concept *green* is a part of it, insofar as I imagine the word 'green' to be part of the ghostly sentence. But this is just metaphorical. Or I can imagine an intuition as a snapshot of the world, and the parts of the intuition as being like the parts of a photograph. But again, as there isn't really a photograph, this is just metaphorical. We need to say something more substantive about what an abstract object is like, and how it has parts.

An example of an abstract object of which we have a relatively good understanding is a set.[6] We might then think of the members of a set as parts of the set. Indeed, Fine writes

> There is a strong prima facie case in favour of taking the members of a set to be parts. For we do indeed talk of a set containing its members and of its being composed or built up out of its members; and, as I have suggested, such talk is not to be dismissed simply on the grounds that sets are not material things. (Fine 2010, 563)[7]

According to the standard definition, the existence and identity of a set depend upon its members, so we can make sense of the whole set being existentially dependent upon its parts, its members. Could such an explanation be extended to representations? Perhaps there is scope to give an account of concepts as sets, for example, as functions from objects to truth-values (taking a function to be a set of ordered tuples). This would give us the correct mereological structure for concepts: the parts (members) being prior to the whole (set).

Could a set-theoretic explanation help us to understand the nature and structure of intuitions? I do not think so. Primarily because, given the point just made, it would yield the wrong direction of dependence between the whole and parts of an intuition. Moreover, it is not clear how an intuition could be a set. In the case of concepts, we can recognise a that a concept is at least associated with a set of things falling under it—its extension. And we can recognise that functions can be thought of as complex sets, and concepts as functions. But an intuition's role is to present us with an object: it gives us the things which might be collected in the extension of a concept, or which might be arguments for the function.

Another way to take representations to have parts is in terms of them *representing things as having* a part-whole structure. So, for example, we represent space as having parts only as limitations of the whole, and so therefore we take the representation of space *itself* to have this mereological structure. This option is

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[6] Wilson (1975) gives an account of the differing part-whole structures of concepts and intuitions in terms of the former structure being akin to the set-theoretic notion of membership, and the latter having a mereological structure. Here I am taking 'mereological structure' to range more widely, and take different forms, whereas Wilson takes the notion more narrowly. However we take it, simply attributing mereological structure to intuitions does not help us to answer the present question of how to understand the nature of a representation so that it has that structure.

[7] There is a complication. Strictly speaking, the membership relation is not a parthood relation, because membership is not transitive, whereas it is generally understood that parthood is. Fine suggests that the ancestral of the membership relation – 'where this is the relation that holds between *x* and *y* when *x* is a member of *y* or a member of a member of *y* or a member of a member of a member of *y*, and so on' (Fine 2010, 53) – is the parthood relation for sets. The members of a set are still parts, albeit its most direct parts.

perhaps suggested by Kant's argument above, insofar as he seems to appeal to how we _represent_ space as having parts.

Such an option could be interpreted in two ways. First, representations have a mereological structure, but that structure is wholly derivative on how they represent things to be. Or second, representations in fact have no such structure, but we merely ascribe to them the structure that they represent things as having. In the first case, we retain the claim that representations genuinely have a mereological structure, but we need to say more about why we would expect that structure to be isomorphic to, or otherwise systematically similar to, the mereological structure of the object of representation. In the latter case, we would be giving up on the substantive mereological claim completely. It might even be appropriate to develop some kind of error theory, to explain why it is that we attribute mereological structure to items that in fact lack this structure.

However we develop this option, a significant obstacle stands in its way. Our ambition is that mereology could be used to distinguish between intuitions and concepts, but this sense of part does not allow us to do so. We may be able to argue that intuitions represent things as having a 'prior whole' structure. However, some representations that we would want to class as concepts also have this structure, in virtue of representing things as 'prior wholes'. For example, our concept of a human body represents a whole in terms of which we can understand its parts. We do not think of a body as being composed of its parts: bodies are not made from antecedently existing bones, organs, muscles, and so on. Rather, we think of the parts as growing alongside with, and discernible in the context of, the whole body. Perhaps more strikingly, even if Kant is right that our primary representation of space is intuitive, it is plausible to think that we still have a concept of space. That concept, if it represents space correctly, represents it as having parts only as a limitation of the whole. But that does not mean that our concept of space is an intuition.

Rather than taking a representation to be a special kind of object, it may help to think in terms of an _ability_. Note that Evan's Generality Constraint concerned what a subject _can do_ (recombine parts of thoughts). As Heck puts it,

> The ability to think that a is F must decompose into the abilities to think of _a_ and to think of a thing as F, abilities that are sufficiently distinct that one's being able to think that _a_ is F may be _explained_ by one's being able to think of _a_ and one's being able to think of a thing as F. (Heck, 2007, p.9)

Heck thus presents the view that the grasping of a concept, say, the concept _horse_, is an ability, say, the ability to think of a thing as a horse. Moreover, that ability _partially explains_ other abilities, such as being able to think that Dobbin is a horse, or that horses are mammals.

The proposal is thus to think of representations as abilities, and the parts of representations as abilities that partially (note: _part_-ially) explain the whole ability. For example, one might take some parts of the concept _bachelor_ to be the concepts _unmarried_ and _man_. We can think of our ability to think of a thing as a man as partially explaining our ability to think of a thing as a bachelor. This looks like a promising account of the mereological structure of concepts. It is plausible that our more complex abilities depend for their existence and nature on simpler, constituent abilities. For example, just as my ability to think of a thing as a bachelor depends

upon my abilities to think of things as men and as unmarried, so one might take my ability to drive a car to be a complex made up of, and dependent upon, a range of other abilities, such as abilities to observe, press pedals, react quickly, and so on. This dependence relation is further suggested by the fact that we can diminish a more complex ability by removing one of its parts. For example, if my reaction times slow down significantly, my driving will suffer. Likewise, if my competency with the concept _man_ is diminished, so one would expect my ability to think of things as bachelors to be similarly diminished.

Can we apply the proposal to intuitions? What ability or capacity could an intuition be? The role of intuitions is to present us with objects, without which our thoughts could not get in touch with objects, so we might take an intuition of an object _x_ to be the capacity to have thoughts about _x_. However, this would be to assume that any subject capable of having intuitions is also capable of thought. But it is plausible that something like sensible intuition is a capacity shared by humans and other animals, whereas only humans have the ability to also apply concepts to particulars and engage in conceptual thought (see Allais and Callanan, forthcoming). If we do not want to rule out the possibility of subjects that can have intuition but not conceptual thoughts, then we cannot define intuition in terms of a capacity to have thoughts.

An intuition of _x_ will come along with a range of other potential abilities, such as the ability to move around _x_, track it, sniff it, but none of these look like necessary conditions. It might be that an intuition of _x_ always comes along with some such abilities, but it seems plausible there is no privileged ability or set of abilities that necessarily accompanies intuition. At least, this is probably an empirical question, that would rely on a prior understanding of what an intuition is, in order to test what abilities accompany it.[8] Hence, I conclude that _partial abilities_ might be a helpful way to think about the kinds of parts that concepts have, but not intuitions.

Another approach which is amenable to concepts is to understand their parts in terms of inferential properties. Theories that associate concepts with some or other inferential abilities or relations are common.[9] If such a view is otherwise defensible, we can think of the parts of a concept C as those concepts the satisfaction of which is implied by C's satisfaction, and/or as those concepts the joint satisfaction of which is sufficient to imply the satisfaction of C. For example, the satisfaction of a thing by _man_ and _unmarried_ is implied by its satisfying the concept _bachelor,_ and if something satisfies both _man_ and _unmarried_, then we can infer that it satisfies _bachelor_.

Again, we have a conception of a representation and the way it can have parts that is amenable to thinking about concepts, but not intuitions. An intuition of a particular _x_ does not, just on its own, license any inference. It may enable us to make inferences _about x_, for example, that if _x_ is a bachelor, _x_ is a man. But the intuition

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[8] One might choose some abilities and define an intuition as that set of abilities. But to do so would rule out the possibility of finding creatures that can have the same broad kind of representation—something with the role to present the creature with objects—realized in a very different way. For example, Kant compares our variety of sensible intuition with intellectual intuition (B145; B308; A256/B311-2). Intellectual intuition would arguably involve some different abilities, but still essentially involve the direct presentation of things.

[9] A representative example is the view of Brandom. See his (1994; 2000; 2008; 2009). See also Landy (2015) for an inferentialist reading of Kant.

does not involve inferential connections between just itself and something else, unlike, say, the connection between the concepts _bachelor_ and _man_. As above, we also shouldn't take an intuition of _x_ to be an ability to make inferences about _x_, because we want to leave it open that beings without the capacity for logical reasoning could still have intuitions.

In summary, I have considered several ways to understand a representation as having parts. Several seem promising as accounts of the way that concepts have parts. But I have argued that none so far is able to capture the sense in which an intuition has parts. In the next section, then, I propose one further way to think of intuitions that does better.

V. Intuition and Presentation. When we ask how a representation has parts, it is natural to imagine something like a picture or a sentence and then to consider how it might be carved up, or from what it might have been composed. But this is not a helpful way to think about the kind of sub-propositional-sized representations at issue. We have already seen that promising accounts of the parts of concepts are not to be thought of on this model, but as something less 'word-like', such as an ability.

Similarly, in the case of intuitions we should think again. The role of intuition is not to present anything _as_ being a certain way. Intuitions simply present us, immediately, with objects. Indeed, some discussions of intuitions characterize them as _presenting_, rather than _representing,_ objects.[10] This can be understood as the view that intuitions relate us directly to objects, rather than having an intentional content that represents objects. There is scope for a great deal of subtlety and detail in developing different such accounts of intuition, and what, if any, role might be played by intentional content. My aim here is to focus solely on the mereological question: how can thinking of intuitions as _presenting_ help us to understand their mereological structure, and thereby to distinguish them from concepts? There are myriad other considerations that I will be unable to address here. My aim is not, therefore, to present a well-rounded interpretation, but only to contribute to the mereological aspect of one.

I propose, then, to see where we get if we think of an intuition as an instance of a relation between a subject and an object: the presentation relation.

This interpretation offers us a way to understand the singularity and immediacy of intuition. First, if an intuition is a relation between a subject and an object, then its singularity can consist in the fact that it relates us to a single object: 'The idea that intuitions are singular means that there is a particular thing the intuition presents' (Allais, 2015, 154).

One might worry, however, that it seems that we can be presented with pluralities in our experience of the world. For example, I might simply be presented with _some things_ without them having to be presented to me as a collection or whole—I could have an intuition of _The Beatles_, taken as _them_, not as a single group. There are different ways we might respond to this worry. (1) We might allow that a single instance of the presentation relation can hold between a subject and

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[10] See Allais (2015) for discussion of the translation of 'vorstellung' as 'presentation' rather than 'representation'. Broad, Pluhar, and Schwarz also use 'presentation' over 'representation'.

variably many objects: many objects can, in a single stroke, be presented together to a subject. This would be to give up on the letter of Kant's view, but it would retain the immediacy of intuition. Moreover, the sense in which intuitions could present more than one thing would still be different to the generality of a concept. Concepts are general because they represent via marks that things can share; intuitions would be plural because a plurality of things are presented, not because they share any features. Alternatively, we might retain the principle that one intuition presents one single thing. Either (2), in an apparent presentation of plurality, we posit a plurality of singular presentations, or (3), we posit a singular presentation of a group, the parts or members of which could only be discerned with the application of concepts. For example, we could construe a presentation of The Beatles in terms of four distinct presentations. Or we could construe it as a single presentation, in which four men could be discerned once appropriate concepts are applied. I will not adjudicate between these options here. It is enough to note that there is ample scope to accommodate plural intuitions if necessary.

Second, if an intuition is a direct relation between an object and a subject, then we can understand the claim that they are _immediately_ related. This is in contrast to a case where a subject is related to an object via an intermediary, for example, a mental image that is of the object.

Allais interprets the immediacy claim in terms of dependence: 'As I read Kant's immediacy claim, he thinks that intuitions are object-dependent in the sense that we have an intuition of an object only when that object is in fact present to us' (p.156). This object-dependence can be accounted for in terms of the relational view: if an intuition is a relation between a subject and an object, then if there is a relatum missing, there is no relation. Just as there is no intuition if there is an object but no subject present, so there is no intuition if there is a subject but no object. Whether or not it is correct to interpret Kant as claiming that intuitions are object-dependent is a matter of some controversy.[11] This is also complicated by the fact that there are different strengths of dependence. Must an object be present at the same time as one intuits it, or just either at the same time or prior to the time of the intuition of it, or something even weaker?

It seems to me that as long as we can make sense of there being _something_ presented, _some_ relatum, whether it be concurrent or not, or recombined or whatever, then there is scope to think of intuitions as relations. A serious problem therefore arises if we want to make sense of misleading intuitions, that is, hallucination and illusion. If it seems to me as if I am presented with some object _x_, but it turns out that I'm wrong, how can we explain that? If I have an intuition of _x_, then _x_ must exist, so how can we account for hallucinatory intuitions?

Again, this is a matter of controversy.[12] I thus offer a sketch of a way that intuitions, conceived of as relations, can meet this challenge, and leave the details for elsewhere. It is an important feature of Kant's account that there are _inner_ intuitions as well as outer intuitions. Outer intuitions are of objects outside us in space. Inner intuitions are of our own mental states. One way to account for hallucinations is in terms of our mistaking an inner intuition for an outer intuition. For Kant, whilst the forms of sensibility are space and time, there is no one sense with

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[11] See for example Gomes and Stephenson (forthcoming) and Stephenson (2015).
[12] See Stephenson (2015).

both space and time as its forms. Rather, outer sense has the form of space, so that outer intuitions are spatial in form, and inner sense has the form of time, so that inner intuitions are temporal in form. Our intuitions of the outer world present it as being in space and time because outer intuitions—in spatial form—pass through the mind and thereby are presented in inner intuition, as with any other mental state, and thereby also given temporal form (see A34/B50-1). As at least some outer intuitions become objects of inner intuition, it seems thereby plausible that we might (mis)take an inner intuition to be presenting a genuine outer intuition when in fact it is presenting some other inner state. Ultimately, the important point for present purposes is that _all_ intuitions have an object, only in some cases this inner object is not an outer intuition, but some other kind of inner state. Hence, there is no bar from hallucination to taking intuitions to be relations, and thereby object-dependent.

I now turn to how thinking of an intuition as a presentation relation helps with the mereological question. The following is our target view: An intuition is an instance of the presentation relation. The presentation relation is simple: it has no prior parts upon which it depends. However, intuitions must be presented to us in a particular form – in space and time. This means that intuitions do have some further structure that we can discern, in terms of which we can take an intuition to have parts. But these parts are posterior to and dependent on the intuition as a whole. Parts existentially depend upon the whole. The nature of those parts may depend to some extent on the nature of the whole, but it may also depend upon the mechanisms by which we decompose the whole into parts.

At the core of the proposal is the idea that (an instance of) the presentation relation is simple. In some cases, it does make sense to think of a relation as having component parts. For example, perhaps the cousin relation is in fact a complex of relations of parenthood and siblinghood, and perhaps siblinghood in turn is composed out of parenthood relations. The thought is that the presentation relation is different. There are no obvious candidates, as in the case of cousinhood, for component parts upon which the whole presentation relation depends. It is simply a primitive intentional relation between subject and object.

If intuitions are presentation relations, in what sense could they have parts? An answer to this question will require a diversion through the metaphysics of properties and relations. In other words, what is a relation and in what sense could that kind of entity have parts?

Let us begin with a traditional option: properties and relations are universals. It is distinctive of a universal that the very same – numerically identical – universal is present in all its instances. So, for example, the very same relation is present in Jack's being presented with a rock, and Jill's being presented with a tree. For present purposes, we want to allow that there are distinct intuitions, for example, an intuition of the rock is distinct from an intuition of the tree. If we take the intuition to be just the universal presentation relation in each instance, then given that the relation is one and the same universal, the intuitions will turn out to be identical, not distinct after all. In order to ensure the distinctness of different intuitions, then, we need to consider an intuition to be, not merely a universal, but a relational complex in which the universal and its relata are combined. For example, the state of affairs combining _presentation_, Jack, and the rock, is distinct from the state of affairs

combining *presentation*, Jill, and the tree, in virtue of containing different constituents.

The problem with this view, however, is that it gets the mereology wrong. The relational complex is best understood as a whole dependent on its parts, that is, dependent on and composed from *presentation*, subject, and object. But the mereological structure of an intuition is supposed to be the other way around. One might respond with an account according to which states of affairs are fundamental and their parts are abstractions from the whole. For example, Armstrong (1978) presents such a view. I will not rehearse all of the criticisms of this view.[13] But consider: is it plausible to think that either the subject or the object is an abstraction from an intuitive state of affairs, dependent in some way on that state of affairs? *Prima facie,* we would, on the contrary, expect things like Jack, Jill, rocks and trees to exist independently of states of affairs in which they are presented to, or presented.

Nominalist alternatives to universals give an account of properties and relations in terms of some other kind of entity, for example, sets or classes. It is standard to take the semantic value of a relational predicate to be a set of ordered tuples – for example, the semantic value of 'is a sister of' is the set of pairs of sisters. Can we take the presentation relation to be the set of ordered pairs of subject and presented object, and an instance of the relation – an intuition – to be a member of the set (i.e., one of these ordered pairs)? No. If an intuition is a set, then its mereological structure will be that of a set. But I have already discussed above that this has the structure of the parts (members) being prior to the whole (set). So this account would yield the wrong mereological result.

The best prospect for giving metaphysical support to the target view is to think of an intuition as a presentation relation *trope*. Tropes are qualitative and particular. One can think of a trope as being like an instance of a property or relation, but where it is a genuinely particular thing (*this* redness, *that* presenting). Importantly, different instances of 'the same' relation are numerically distinct tropes. Such tropes do not have their bearers or relata as parts, rather, if anything, they are understood to themselves be parts of those bearers. For example, sometimes tropes are introduced as abstract parts: just as we can think of a rose as having concrete parts—its stem, petals and thorns—we can think of it as having abstract parts—its colour and scent. One might plausibly take the existence and/or the identity of a trope to be dependent on its bearer(s): for example, the rose's redness may depend for its existence upon the rose – if there was no rose, there would not be its redness – and this trope is the individual it is, rather than the redness of Rudolph's nose, in virtue of being a part of the rose rather than Rudolph. This may suggest, although I will not explore this further here, that at least some tropes are dependent parts of a whole, but it does not suggest that they themselves have parts, let alone parts upon which they depend.[14]

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[13] See, for example, Devitt (1980), Lewis (1983), and Van Cleve (1994).
[14] Whether the identity of a trope depends upon its bearer is disputed. See, for example, Beebee and Dodd (2005). Also, one might think that the redness of the rose depends upon some parts of the rose, e.g., the petals. But importantly, this is not understood as the redness as a whole depending upon *its own* parts.

These features mean that appeal to a presentation *trope* ensures the distinctness of different intuitions, without requiring the relata to be parts of the intuition (unlike the relational complex view). There are presentations (of objects to subjects), just as there are rednesses (of roses). Even if we take an intuition to be individuated by, or have its identity determined by, its relata (a particular intuition is the presentation of *Jack to Jill*, say, rather than the presentation of *Bill to Ben)*, this would not mean that its relata are thereby its *parts*. (Compare: we might identify Mary as the first daughter of Henry, but this does not mean that Henry is a part of Mary.) In general, tropes are thought of as simple entities, i.e., they have no prior parts. Hence, presentation tropes promise to yield the right mereology.

If we take intuitions to be presentation relations tropes holding between subjects and objects, we can explain why the parts of intuitions are not prior to the whole: tropes are simple. The next question is to consider how such a thing could have parts at all. To properly capture the mereological claims made by Kant, we need to understand how an intuition can have parts that are posterior to it.

What allows us to discern parts in an otherwise simple intuition? I suggest: temporal and spatial form. Kant argues that our representations of space and time are intuitions. But he also argues that they are pure, that is, not derived from sense experience. However, if they are not presented to us via the senses, how can they be intuited? Kant answers: they are *forms* of intuition. Kant writes in the *Prolegomena*

> *How is it possible to intuit something* a priori? An intuition is a representation [*eine Vorstellung*] of the sort which would depend immediately on the presence of an object. It therefore seems impossible *originally* to intuit *a priori*, since then the intuition would have to occur without an object being present, either previously or now, to which it could refer, and so it could not be an intuition. (4:281-2)

> There is therefore only one way possible for my intuition to precede the actuality of the object and occur as an *a priori* cognition, *namely if it contains nothing else except the form of sensibility…* (4:282)

The result is that particulars are presented to us (intuited) as being in space and time. Space and time are the forms of intuitions. But how should we understand this? Are they the forms of the intuitions themselves, or of what is intuited?

The latter route seems plausible: what Kant means is that objects are presented to us – intuited – as being in space and time. How could this provide us with an account of the mereological structure of the intuition itself – our target question? It would require us to revive an earlier option: representations have the mereological structure they represent things as having. My primary concern with this was that it would blur the distinction between concepts and intuitions, as concepts can plausibly represent things as 'prior wholes' too. However, we now have the resources to respond to this worry. If intuitions are, at bottom, simple tropes, then representing things as having parts is the *only* sense in which intuitions could be thought to have parts. Indeed, Kant writes

> Every intuition contains a manifold in itself, which however would not be represented as such if the mind did not distinguish the time in the succession

> of impressions on one another; for **as contained in one moment** no representation can ever be anything other than absolute unity. (A99)

This suggests that Kant himself takes intuitions to be primarily simple, and that they _only_ have parts insofar as they represent a temporal structure. Crucially, concepts are different because there are other ways that they can have parts. A concept understood as an ability, or a set, say, already has a mereological structure that does not depend upon the structure it represents things as having.

Still, there is a second option: to take space and time as the forms of the intuitions themselves. It seems reasonable to suppose that at least some tropes are temporally and/or spatially extended. The redness of the rose covers the space filled by its petals, and it endures throughout the life of the flower. Similarly, we might think that a presentation trope extends between subject and object and, perhaps more plausibly, that it extends throughout the time of the presenting. If the thought is that intuitions extend over time, and hence they that at least have temporal parts, one might worry again that the distinction between concepts and intuitions would be blurred. It seems reasonable to suppose that on at least some understandings of a concept, a concept is also temporally extended (e.g., an ability may persist over time). To this, we can make the same form of response as above. Intuitions can _only_ have parts insofar as they are temporally extended. Concepts are different because there are other ways that they can have parts. A concept understood as an ability, or a set, say, already has a mereological structure that does not depend upon any spatial or temporal extension it may also have.

These responses – appealing to the claim that concepts have parts in another sense – raise a further, important, question. Does the view require that all concepts have parts? _If not_, then the mereological structures of concepts would bottom out in some basic, simple concepts. However, this would again blur the mereological distinction between intuition and concept: we would be faced with a class of concepts that – like intuitions – are primarily simple. _If so_, then the parthood relation between concepts will either form an infinite hierarchy or a circle. I.e., either we have conceptual parts all the way down, or at some point a non-linear network of concepts and their parts will be formed. The former view seems highly implausible – that our concepts effectively have an infinite number of more and more basic parts.[15] There is some plausibility in the latter view. One might think, for example, that we could understand our conceptual scheme in terms of a network of abilities, where all such abilities could be understood to depend upon other abilities, but where sometimes that dependence is mutual, either directly, or at some considerable remove. To develop this view, one would have to give up the general principle that all parthood relations are a partial ordering (i.e. reflexive, transitive and antisymmetric.) If one were not willing to give up the principle, this would suggest that this relation amongst concepts is not a genuine parthood relation. I leave this for further discussion elsewhere.

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[15] It is also incompatible with Kant's comments about the ways in which intuitions and concepts can be infinite. Whilst an intuition does have infinite parts in this way – as, indeed, it will if it is temporally extended – a concept does not. See A25-6/B39-40.

In short, spatial and temporal form – in one way or another – promise to give us the resources from which to carve out the parts of intuitions.[16] This proposal depends heavily on the Kantian claim that the forms of intuition are space and time, and so also depends on the success or not of the arguments for those claims. I do not have room to assess these claims and arguments here. Rather, I will comment on one potential objection, which is internal to the issues discussed in this paper. Above, I considered an argument for the conclusion that our representation of space is an intuition, which rested on mereological premises. It was the similarity of the mereological structure of intuitions in general, and that of our representation of space, that was supposed to show that the latter is an intuition. If that argument is to avoid begging the question, it cannot already be assumed that the mereological structure of intuitions is spatial. But now I have suggested that we should understand the mereological structure of intuitions in terms of spatiotemporal structure.

In response: although I am making appeal to the structure of space and time here, this is not what explains that the whole of an intuition is prior to its parts – the crucial mereological feature exploited by the argument. The explanation of the priority of the whole intuition did not make any appeal to spatiotemporal structure: that relied on the simple nature of presentation. The arguments for representations of space and time can then proceed: they are essentially one, with no component parts, and so they are intuitions and not concepts. But they are _a priori_, and so forms of intuition, not objects presented to us in intuition. We can then draw on this result to go back and see how parts of those simple intuitions could be discerned, exploiting this spatiotemporal structure.

VI. Conclusion. In what sense can a representation have parts? More particularly, how can we make sense of sub-propositional-sized mental representations having a part-whole structure? I have attempted to provide an answer that is compatible with, and could be used to support, Kant's distinction between intuitions and concepts. My focus has been on intuition, although I have indicated some promising ways to make sense of the part-whole structure of concepts. I propose that if we take an intuition to be a relational trope, then we can not only make sense of the more familiar aspects of Kant's account of intuitions—that they are singular and immediate—but we can also make sense of the mereological features attributed to intuitions without resorting to metaphor. A presentation relation trope is simple, and so has no prior parts from which it is composed, although the forms of intuition—space and time—provide us with resources to carve up intuitions into parts that depend upon the whole. More generally, I hope to have shown some of the complexities that arise when we take mereological claims about representations seriously, and some options for how we can provide metaphysical support for those claims.[17]

University of Sheffield

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[16] This may or may not also involve the use of concepts, e.g., using concepts to recognise or discern spatial or temporal parts. To decide this would involve delving deeper into the Kantian conceptualism/non-conceptualism debate.

Department of Philosophy, 45 Victoria Street, Sheffield, S3 7QB.

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